Resilience & Transformation: Can We Have Both?

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Message … → …

From a systems view, resilience and transformation are two possible outcomes of a **disturbance** (event) or **emergent behavior** (this can be slow or fast) as the system approaches its maximum (not necessarily an equilibrium) efficiency at the edge of chaos

- If the system withstands the pressure to maintain its state parameters, the system is **resilient**
- If the system breaks or morphs into something else, the system is **transformed** (a phase transition)

Outline

Introduction

- Change and Stability? The Need for Theory
  - Complexity Theory
  - What is a City? What is a Region?

Resilience and/or Transformation as Planning Motivations

- **For Non-Event Circumstances**
- **For Spatial Structure**

Planning for Resilience or Planning for Transformation

- **Decentralization**
- **Aerotropolis**
- **"Compact City"**
- **Migration**

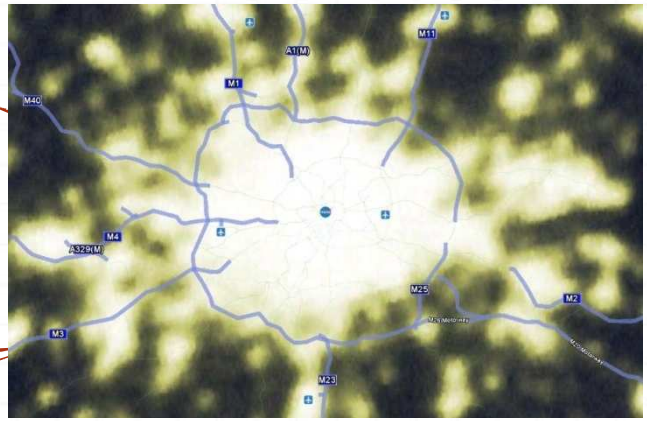
What I Would Like You to Do

Consider the Following Statement (as a set of potential Contradictions)

(*Change for Stability: Lifecycles of Cities and Regions. The role and possibilities of foresighted planning in transformation processes*) has in only 18 words at least 3 theoretical opposites and/or intractable positions.

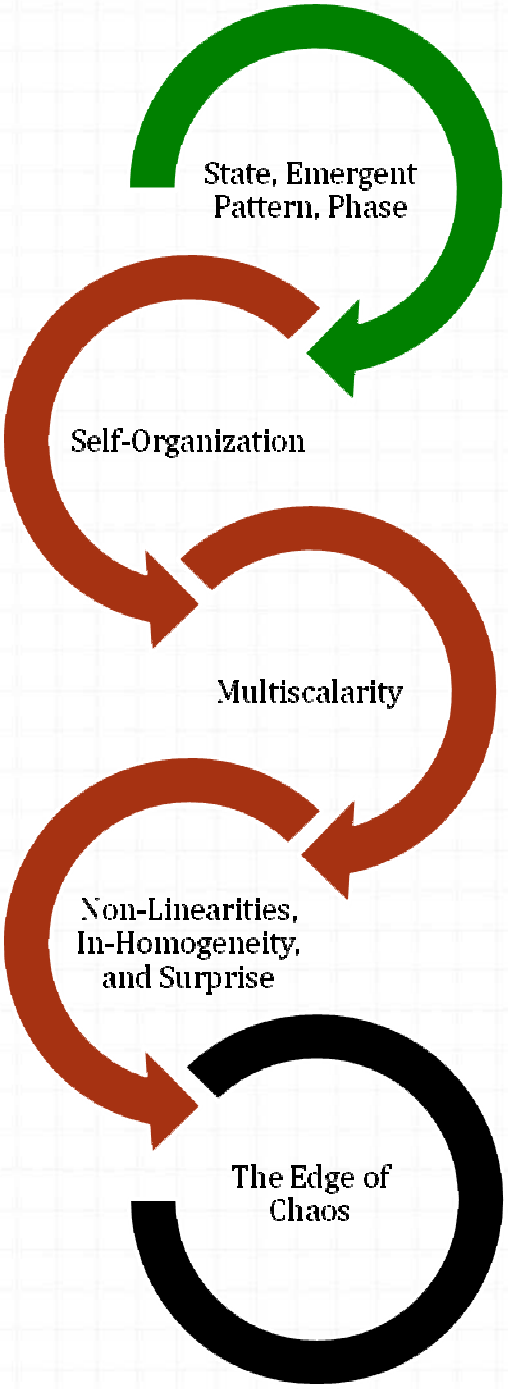
Shows how l**ack of a theoretical structure for phenomenon can becomes problematic.**

Put on 4D Glasses and Focus on the Urbanized Region




Things I Know!
M1
M4
M25
M23
M26 Motorway
Should This Blob + Its Properties Seek Resilience or Transformation?

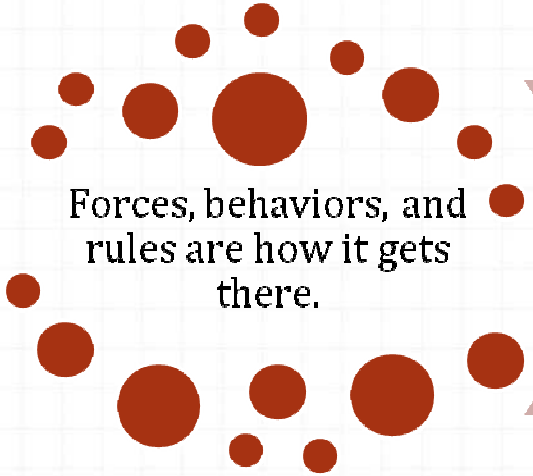
Key Concepts



State

- The "state" of a system is the visceral or observable patterns that most of us can describe
- Describable in terms of its "**properties**" – such as aggregate or overall form, interactions patterns, and/or rules of organization (+ sometimes with reference to external criteria)
- There is a trajectory within systems among "states" – they go through phrase transitions and evolve (this may be defined functionally)

Self-Organization



Forces, behaviors, and rules are how it gets there.

Self-organization is the process where a pattern or structure emerges in a system *without a central authority or external elements imposing it.*

The "state" is the resultant pattern

- Based on 4 basic ingredients:
  - strong dynamical nonlinearity,
  - positive and negative feedback,
  - a balance of exploitation and exploration, and
  - multiple interactions

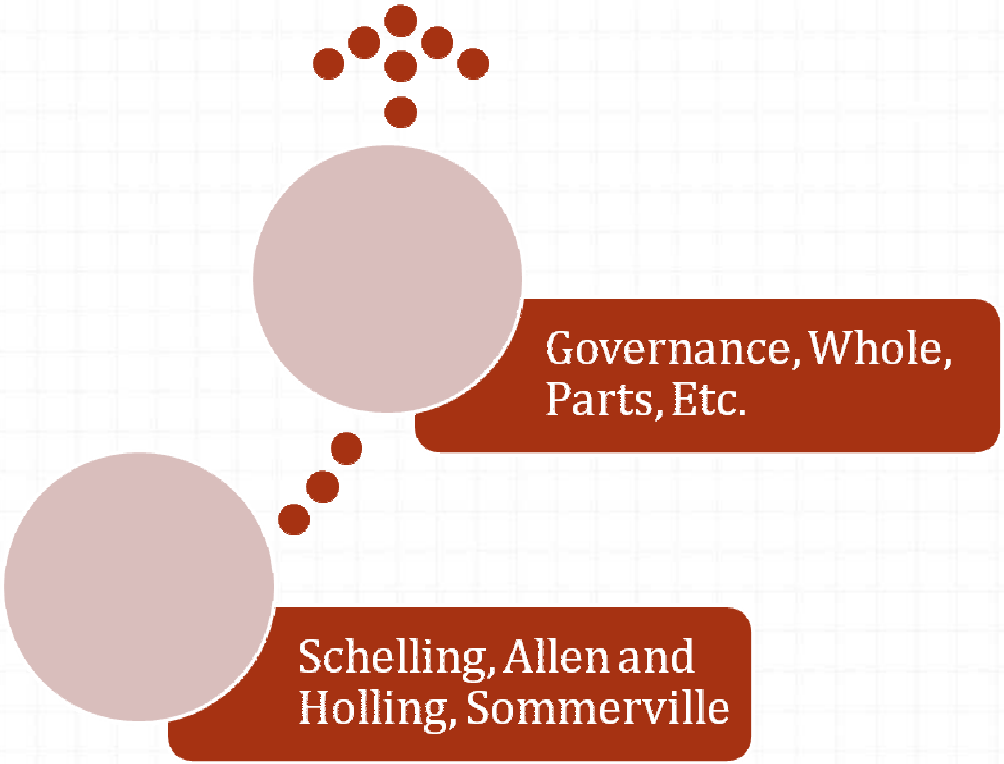
Multiscalarity

Within the "whole" there are processes acting at various scales of resolution.

Local processes with small spatial impact happen at fast temporal scales.

At a **slightly larger scale**, patch dynamics witness the processes of competition for nutrients, light and water influences in influencing species composition and/or regeneration (districts in a city or region competing among themselves).

At the **meso or macro scale** (a city), other processes determine structure and successional dynamics from tens of meters to kilometers, and from years to decades



Non-Linearities, Surprise

Dynamic systems operate through time.

Some system attributes are linear; others are more complex, some even turn back on themselves as in chaos theory. Trends are sometimes susceptible to "step" behavior.

The cause of the jump is of course the motivation or object of analysis and/or planning. These may be unplanned or planned.

Sometimes, the impetus or cause of the jump is merely "surprise".

If the impetus is large enough, it is possible for the "state" of the system to change.

The principle of in-homogeneity argues that the impetus itself might change over time. Thus, a city built on water transportation yielded a characteristic "form". When succeeded by air transportation, a new (not resilient to the old) form emerges.

D'Arcy Thompson's (1917) famous dictum about ecological systems (natural or social): **Growth Creates Form, Form Limits Growth**.

A Decision Point: The Edge of Chaos

There are three possibilities.

- First, the relationship between driver variable and resultant pattern will behave as expected
- Second, the value of the driver variable reaches its maximum value for the relationship to continue to exist – this is the point of maximum complexity (but still ordered, also defined as maximum efficiency). This is the "edge of chaos".
- Third, further energy or levels of input variables will cause the relationship creating the former emergent pattern to disintegrate; the resulting pattern will change from "state 1" to "state 2". This is transformation

Simply put, resilience and transformation are two sides of the "EDGE OF CHAOS", a decision point.

Ecologist and economist notion of "elasticity"

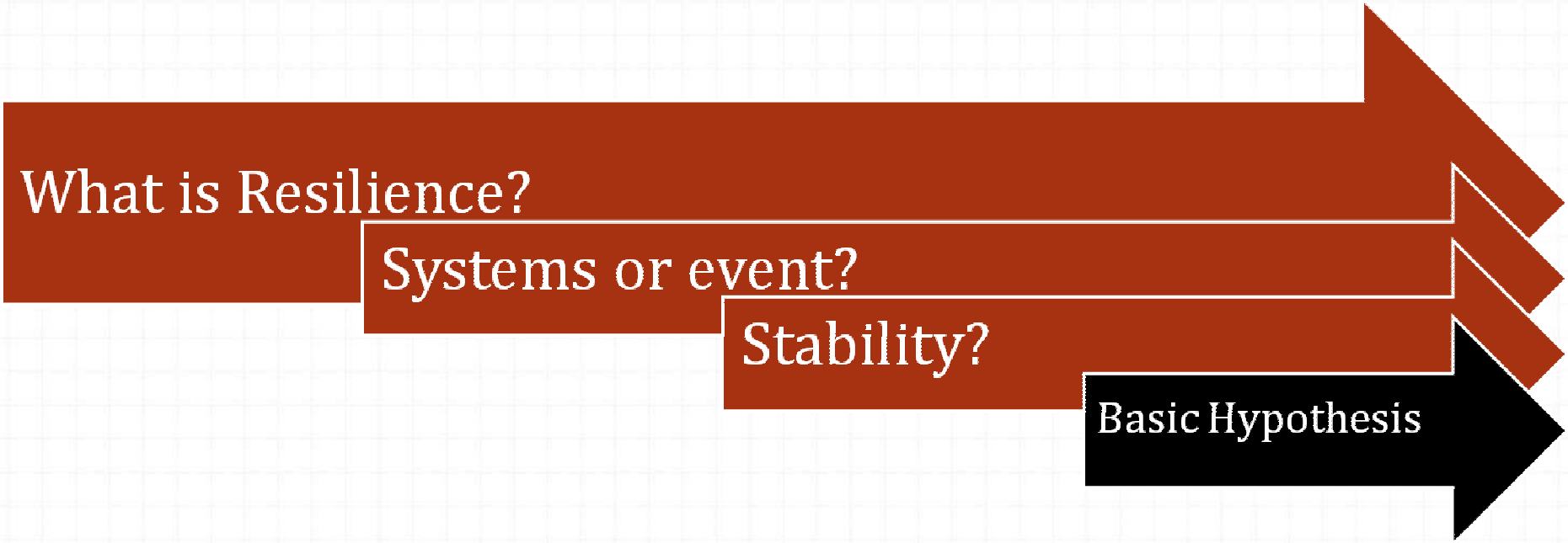
What is a City? What is a Region?

- A Possibility: The Non-Definition of Bogart
- A Possibility: The Systems Approach of Bourne

Bogart's Table

Criterion	Benchmark
Employment in Centers	Employment is distributed over the metropolitan area; 30 to 40% of it is located in identifiable employment centers. Downtown remains the largest center, but its dominance is attenuating downwards Employment centers are relatively specialized and unique
Commuting	25 minutes on average, 85% less than 45 minutes Distances have increased, but time has not (decentralized jobs)
Density	Average person lives in areas of 3,000/sq mi / 4.6 persons per acre Average person works in areas of 4,000/sq mi / 6.2 persons per acre ½ live within 5 miles of CBD, 40% of employment is within five miles of CBD
Congestion	Has increased; Typical commuter spends 47 hours/year "stuck" in traffic
Plans for Buildings	Sports, convention centers, designed to attract business travellers and tourists both from "within" and "outside" the metro area
Universities	At least one high quality university
Segregation	Quite segregated by race, but falling Quite segregated by income, and it persists

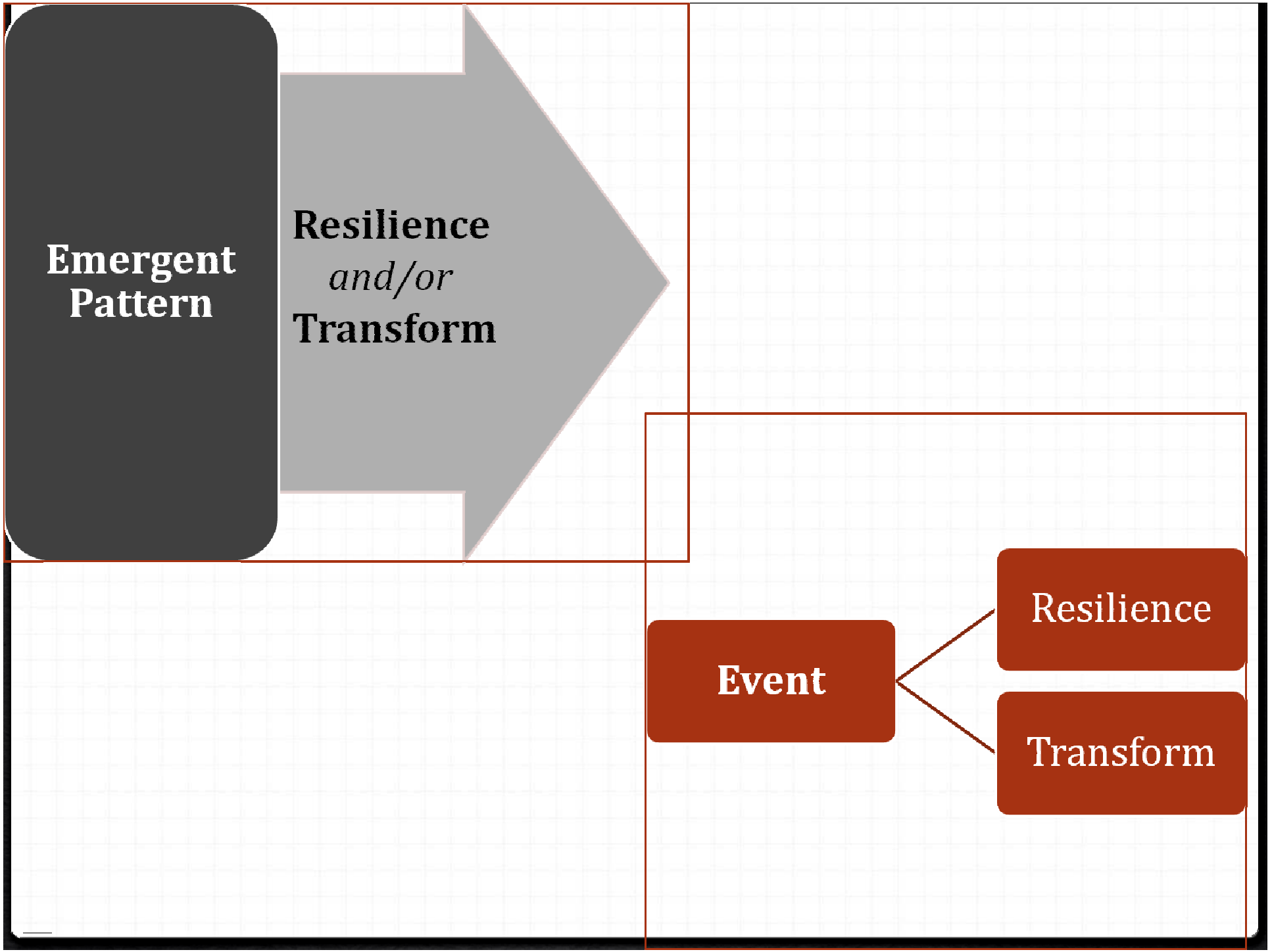
Resilience and Transformation



Scientific v. Psychological Resilience

Scientific Resilience is the property of a material to absorb energy when it is deformed elastically. It is the maximum energy per unit volume that can be elastically stored.

Psychological Resilience is the capacity of people to cope with stress and adversity. A resilient person bounces back to a previous state of normal functioning or uses the experience to produce a "steeling effect" to function better than expected.


Emergent Pattern
Resilience
and/or
Transform
Event
Resilience
Transform

Examining Change

It is about CHANGE. A normal definition of stability would have two elements: **a description of some attribute, property or status** and a reference to **time.**

- **Economic stability**
- **Ecological stability**

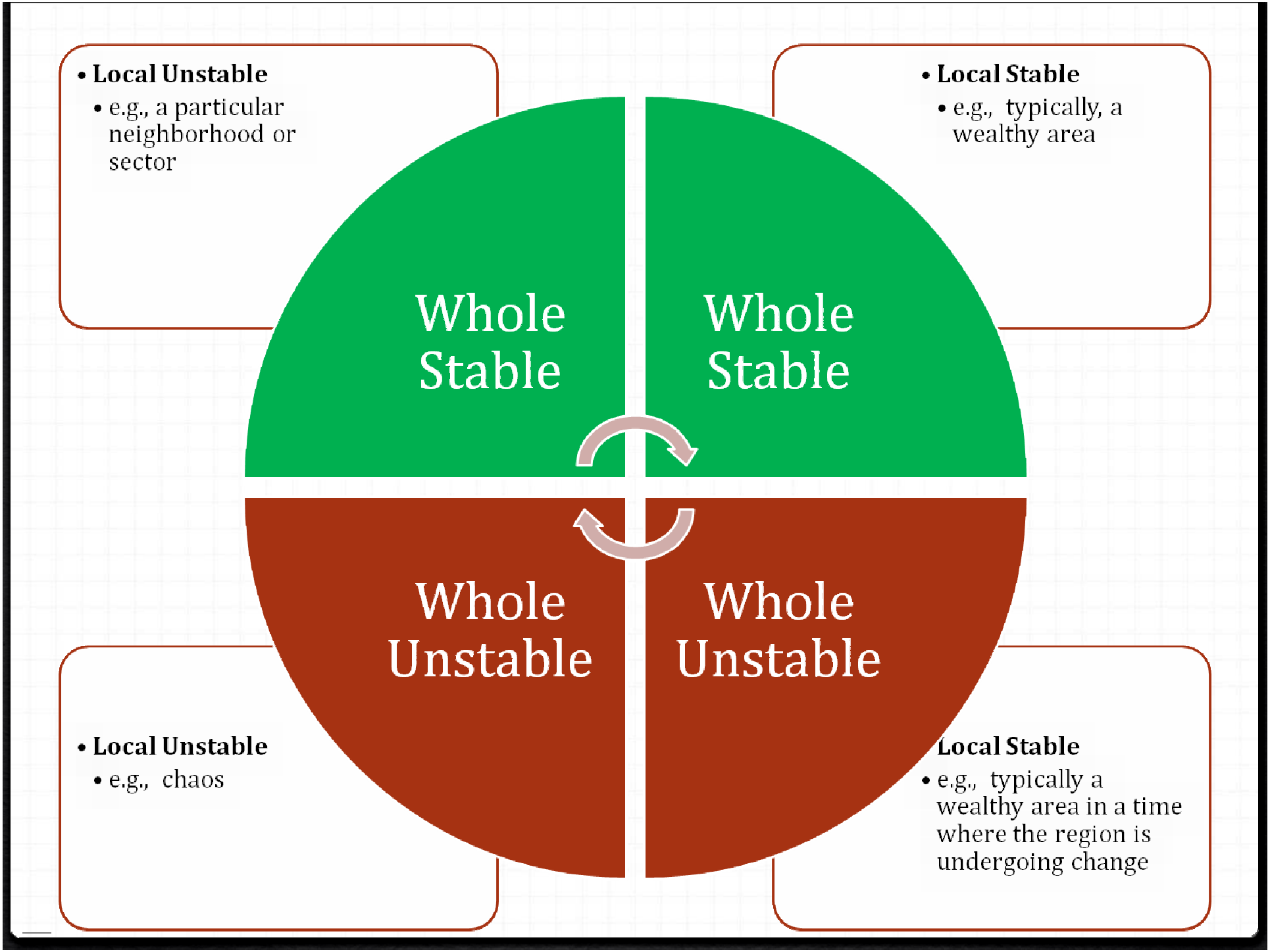
Change must be assessed in terms of something.

- Is change intended or results in resilience (keep the current status) or is it intended to result in transformation (changes the current form and pattern).

Is New Orleans a resilient city in terms of thinking about its future?

Was the former New Orleans – its properties and structures prior to 2005 – resilient?

- **Quite possibly and NO!**


• Local Unstable
• e.g., a particular neighborhood or sector
• Local Stable
• e.g., typically, a wealthy area
Whole Stable
Whole Stable
Whole Unstable
Whole Unstable
• Local Unstable
• e.g., chaos
Local Stable
• e.g., typically a wealthy area in a time where the region is undergoing change

Can We Have Both?

Theoretically,

NO!

Some Planning Contexts

Metropolitan Decentralization: Howard, Hadid

Airports, Aerotropolis

“Compact City” (particularly in the Netherland’s Randstad)

Migration and Neighborhoods

Metropolitan Decentralization

- Really, a policy –
  - In London in the 1890s
  - In Istanbul in the 2000s

- The idea that metropolitan regions go through **transformations** to accommodate existing modes of production
  - The Pre-Industrial City
  - The Industrial City
  - The Post-Industrial City (Global City)

Airports, Aerotropolis

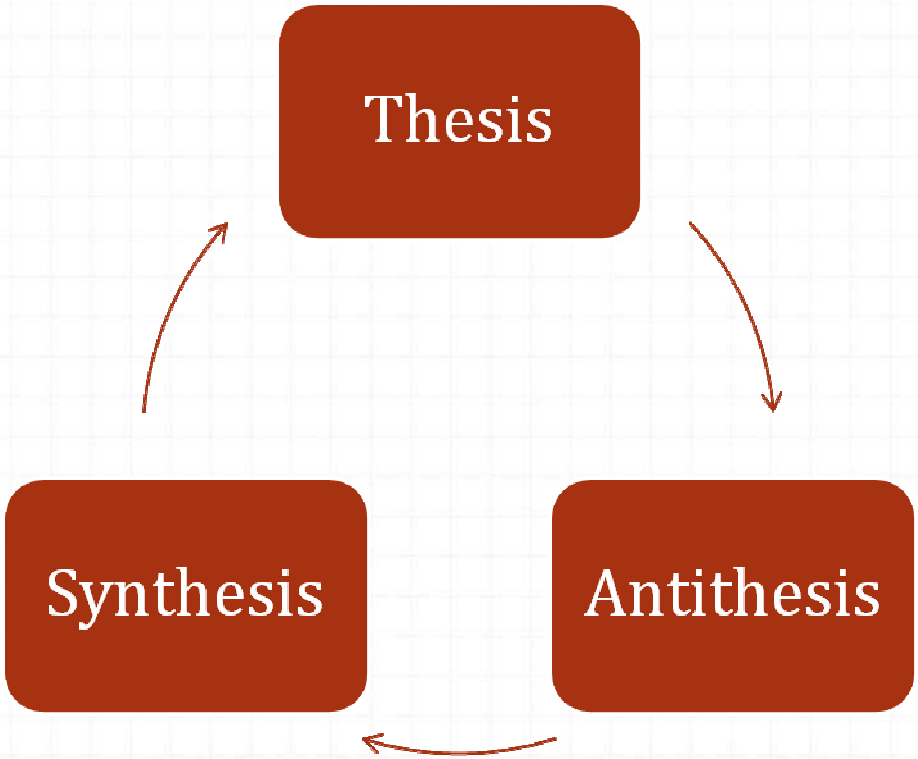
- Schwechat in Vienna
  - Trying to Become A Major Player
  - Economic Activity around the Airport and in the town of … (oh, yeh, Schwechat)
- Berlin
  - Two Existing Airports (Not Very Well Connected)
  - BBI as major new node – passengers and cargo – direct attempt to put Berlin on the world air route map

The Concept of the Compact City
(particularly in the Netherlands)

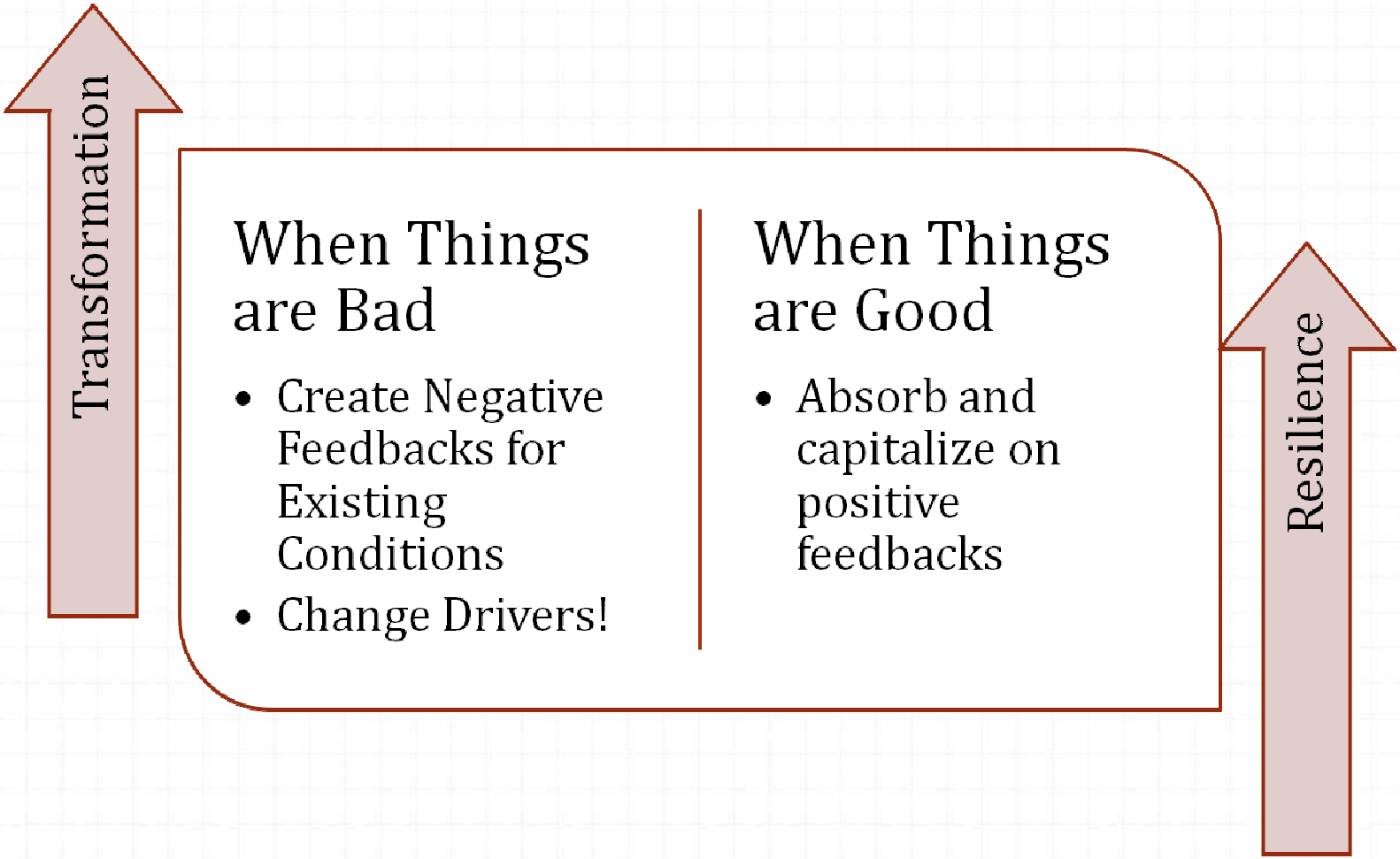
- Compact Cities
- Compact Region (Randstad)
- Compact Interactions Within a Dispersed City-Region

Migration and Social Stability

- Still an Issue
- Back to Burgess
- Or Hegelian "dialectical progress"



Conclusion


Transformation
When Things are Bad
• Create Negative Feedbacks for Existing Conditions
• Change Drivers!
When Things are Good
• Absorb and capitalize on positive feedbacks
Resilience

Thank You for Your Attention!

Yes, and No! and
Yes, and No!
It Depends on the
Specific Question!

Resilience and Transformation are Theoretical Opposites and May Represent Opposite Motivations

Resilience could be a useful metaphor for spatial analysis/design/planning

For More on Complexity Thinking

- Metaphors from the Resilience Literature: Guidance for Planners (Scotti-Petrillo & Prosperi), Thursday 9am
- Long Waves, Lifecycles, and Urban Development: Context for Short-Term Purposeful Action (Alvarez, Root, Prosperi & Enlil), Friday, 9am